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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/711,682	09/30/2004	**Chung-nin Chau**	04-2-410	5681

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OSRAM SYLVANIA INC
100 ENDICOTT STREET
DANVERS, MA 01923

EXAMINER	
HEVEY, JOHN A	
ART UNIT	**PAPER NUMBER**
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/711,682	CHAU, CHUNG-NIN	
	Examiner	Art Unit	
	JOHN A. HEVEY	4116	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 September 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/3/2005, 2/13/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Application

Claims 1-28 are pending and presented for examination.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bogner et al. (US2003/0020101) in view of Brese et al. (US5643496).

Claim 1 is drawn to an electroluminescent lamp including a phosphor blend comprising a mixture of a blue or blue-green emitting electroluminescent phosphor and a europium activated alkaline earth silicon nitride phosphor. Claim 2 further requires the europium activated alkaline earth silicon nitride phosphor represented by the formula $M_xSi_yN_z$:Eu, wherein M is selected from Ca, Sr, and

Ba and where z=2x/3 + 4y/3. Claim 17 is an independent claim drawn to the phosphor blend comprising a mixture of a blue or blue-green emitting electroluminescent phosphor and a europium activated alkaline earth silicon nitride phosphor as required by claim 1.

Bogner teaches a light source comprising a nitridosilicate type phosphor represent by the formula $M_xSi_yN_z$:Eu wherein M is selected from Ca, Sr, Ba and where z=2x/3 + 4y/3 (see [0009]). The reference further teaches the europium activated phosphor may be combined with one or more phosphors such as red and green emitting phosphors, and is combined with a blue light emitting primary source such as an LED (See 0014] and [0027]). Bogner teaches another embodiment comprising the europium activated phosphor in combination with well known blue and green emitting phosphors (see [0051]). The reference does not specifically teach a lamp with said phosphor blend, but teaches a light source in which suitable applications include lamps (see [0001]). It would have been obvious to one of ordinary skill in the art to modify the light source as taught by Bogner for use as a lamp as required by the instant claim 1. In addition, it would have been obvious to one of ordinary skill in the art to use a well known or commercially available blue or blue-green emitting electroluminescent phosphor as taught by Brese et al. (see col. 3, lines 15-60). One would have been motivated to make such a modification in order to obtain a better light source with improved life time, comprising the europium doped phosphor of Bogner with a well known blue or blue-green emitting phosphor as taught by Brese.

In regards to claims 3-5 and 18-21, Bogner teaches a phosphor represented by the formula $M_xSi_yN_z$:Eu wherein z=2x/3 + 4y/3 and M is selected from Ca, Sr, and Ba and examples where x = 2, y = 5 and also where x = 1, y = 7. Bogner teaches specific examples including $Ca_2Si_5N_8$:Eu, $Sr_2Si_5N_8$:Eu, $Ba_2Si_5N_8$:Eu, $BaSi_7N_{10}$:Eu (see Bogner pg. 2, Table 1).

In regards to claims 6 and 22, the references fail to teach a phosphor blend containing 10-20 wt% of the europium activated alkaline earth silicon nitride phosphor. However, Bogner establishes that the concentration of europium activated alkaline earth silicon nitride phosphor is a result effective variable (see [0043] and [0049]-[0051]) in that the amount of each phosphor used will result in a different color of light. It would have been obvious to one of ordinary skill in the art at the time the invention was made to choose the instantly claimed ranges through process optimization, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See *In re Boesch*, 205 USPQ 215. One would have been motivated to do so in order to obtain the best results from the phosphor containing light source and maximize industrial applicability of the invention.

In regards to claims 7 and 23, Brese teaches ZnS:Cu are a well known class of electroluminescent phosphors, which may contain other activators such as Al, Cl, and Br, and may emit blue, green, or yellow-orange light. It would have been obvious to one ordinary skill in the art to choose a blue emitting ZnS:Cu or

blue-green emitting ZnS:Cu,Cl such as the blue-green emitting ZnS:Cu,Cl phosphor taught by Brese (see col. 3, lines 15-25). One of ordinary skill would have had a reasonable expectation of success and would be motivated to make such a modification in order to enhance the industrial applicability of the phosphor containing light source.

In regards to claim 8, Bogner teaches a white light LED device comprising a blue emitting light source which optimally emits light with a peak wavelength of 420-470 nm (see [0049]) and further teaches an embodiment where said blue emitting light source is a phosphor (see [0051]). Therefore, it would have been obvious to one of ordinary skill in the art to select a blue emitting phosphor which emits at a wavelength of 400-470 nm with the predictable result of success.

In regards to claim 9, Bogner teaches an europium activate alkaline earth silicon nitride phosphor which absorbs (equivalent to excited) at 400-460 nm and emits at about 610-650 nm (see [0032]) and teaches many specific examples including emission maxima of 603, 619, 644, and 660 nm (see Bogner pg. 3, Table 2).

In regards to cliam 10-12, Bogner teaches a light source with a color rendition index of at least 85 (see Bogner claim 10). Thus, it would have been obvious to one of ordinary skill to make a lamp which exhibits a CRI of about 85 as required by claim 12. It would have been obvious to one of ordinary skill in the art to select from the disclosed range of "at least 85" a lamp with a CRI of

about 85. One would be motivated to make such a modification in order to optimize the properties and increase the industrial applicability of the device.

In regards to claim 13, the references teach the specific color coordinates of the phosphors separately but do not teach a lamp comprising a blend of phosphors with x color coordinates of 0.29-0.39 and y color coordinate of 0.35-0.39 as required by the instant claim 13. However, it is common knowledge in the art that the relative amounts of different phosphors used, affects the emitted x and y color coordinates of the end product. One of ordinary skill in the art would recognize the ability to blend the phosphors to arrive at different final color coordinates. The ranges presented fail to produce an unexpected result, and thus do not impart patentable distinctions.

Claim 14, dependent on claim 13, further requires the phosphor blend contain 10-20 wt% of the europium activated alkaline earth silicon nitride phosphor. The references fail to teach the specific range of said phosphor blend, however, Bogner establishes that the concentration of europium activated alkaline earth silicon nitride phosphor is a result effective variable (see [0043] and [0049]-[0051]) in that the amount of each phosphor used will result in a different color of light. It would have been obvious to one of ordinary skill in the art at the time the invention was made to choose the instantly claimed ranges through process optimization, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See *In re Boesch*, 205

USPQ 215. One would have been motivated to do so in order to obtain the best results from the phosphor containing light source and maximize industrial applicability of the invention.

In regards to claim 15, Bogner teaches specific examples including $Ca_2Si_5N_8$:Eu (see Bogner pg. 3, Table 1).

In regards to claims 16 and 25, Bogner teaches europium concentrations of 1, 2 ,3, 5, 8, and 10 atomic % compared to the alkaline earth ion (see Bogner pg. 3, Table 1).

In regards to claim 24, Bogner teaches a white light LED device comprising a blue emitting light source which optimally emits light with a peak wavelength of 420-470 nm (see [0049]) and further teaches an embodiment where said blue emitting light source is a phosphor (see [0051]). Therefore, it would have been obvious to one of ordinary skill in the art to select a blue emitting phosphor which emits at a wavelength of 400-470 nm with the predictable result of success. In addition, Bogner teaches a europium activated alkaline earth silicon nitride phosphor which absorbs (equivalent to excited) at 400-460 nm and emits at about 610-650 nm (see [0032]) and teaches many specific examples including emission maxima of 603, 619, 644, and 660 nm (see Bogner pg. 3, Table 2).

Claim 26 is an independent claim drawn to a phosphor blend comprising a $Ca_2Si_5N_8$:Eu phosphor and in addition, a blue-emitting ZnS:Cu phosphor, a blue-green-emitting ZnS:Cu,Cl phosphor, or a combination thereof. Bogner in view of

Brese teach a phosphor blend comprising $Ca_2Si_5N_8$:Eu and a blue-green-emitting ZnS:Cu,Cl phosphor as shown in the rejection of instant claims 17, 21, and 23 above.

In regards to claim 27, Bogner teaches europium concentrations of 1, 2 ,3, 5, 8, and 10 atomic % compared to the alkaline earth ion (see Bogner pg. 3, Table 1).

Claim 28, dependent on claim 26, further requires the phosphor blend contain 10-20 wt% $Ca_2Si_5N_8$:Eu phosphor. The references fail to teach the specific range of said phosphor blend, however, Bogner establishes that the concentration of europium activated alkaline earth silicon nitride phosphor is a result effective variable (see [0043] and [0049]-[0051]) in that the amount of each phosphor used will result in a different color of light. It would have been obvious to one of ordinary skill in the art at the time the invention was made to choose the instantly claimed ranges through process optimization, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See *In re Boesch*, 205 USPQ 215. One would have been motivated to do so in order to obtain the best results from the phosphor and maximize industrial applicability of the invention.

Conclusion

All claims have been rejected.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHN A. HEVEY whose telephone number is (571)270-3594. The examiner can normally be reached on Monday - Friday 7:30 AM to 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on 571-270-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

jah

/Vickie Kim/

Supervisory Patent Examiner, Art Unit 4116